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THE COMPARATIVE INTELLECTUAL ABILITIES OF FULL AND MIXED BLOOD INDIANS

(A Study Based on a Testing Experiment of Two Hundred and Eighty-Six Indian Students in Attendance at the United States Indian Boarding School, Wahpeton, North Dakota, 1937.)

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A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

By

Ingaborg Jonasson

In Partial Fulfillment of the Requirements

for the Degree of

Master of Science in Education

June 1937

T1937
J76

CERTIFICATE OF APPROVAL

This thesis, offered by Ingaborg Jonasson, as a partial fulfillment of the requirements for the Degree of Master of Science in Education in the University of North Dakota, is hereby approved by the Committee under whom the work has been done.

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86834

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CHAPTER I

INTRODUCTION

THE COMPARATIVE INTELLECTUAL ABILITIES OF RACES

The study of the comparative intellectual abilities of races is not a new one. Although most of the scientific work in this field has been accomplished in the last two or three decades, the interest in it is old. Before the psychologists entered the field of racial studies, the theories, writings, and findings of anthropologists and historians had revealed much light on the subject. The psychologists were the first to use quantitative methods in making racial comparisons. Measuring devices such as achievement, intelligence, and performance tests, although far from perfect at the present time, have enabled the psychologists to make the initial attempt at a quantitative comparisons of mental reactions of various races--for example, the studies that have been made of the Negroes and Chinese.

The earliest studies of racial differences consisted chiefly in comparing the full bloods of each race. This meant that races with vastly different cultural backgrounds were being compared. For this reason the results of such comparisons were difficult to interpret.

In recent years students of races have become interested in the study of racial mixtures. Here, differences in environmental influences are reduced to a minimum. The study of the comparative performance of full and mixed blood groups offers better opportunity for showing the effect of the mixture of bloods upon the performance.

PREVIOUS STUDIES

In working on the American Negro and American Indian, students of racial comparisons have used two distinct types of tests, the linguistic intelligence tests and achievement tests, both of which reflect the cultural backgrounds of the subjects tested and non-linguistic performance tests which do not so markedly reflect cultural environment and background.

Hunter and Sommermier[1] (1922) gave the Otis Intelligence Test to 715 American Indians in school at the Haskell Indian Institute, Laurence, Kansas. These students came from 65 tribes and represented 14 different tribal mixtures. When the subjects were classified into four groups (1/4, 1/2, 3/4, and 4/4) according to percent of Indian blood, a steady decrease in average scores was found with increase in Indian blood. The medium

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[1] W. A. Hunter and E. Sommermier, "The Relation of Degree of Indian Blood to Scores on the Otis Intelligence Test," Journal of Comparative Psychology, 1922, pp. 11, 257-275.

I. Q.'s of these respective groups were 109, 91, 78, and 67. These differences were statistically reliable. The correlation between degree of Indian blood and total score with the factors of age and month of schooling constant was .41.

Jamison and Sandiford[2] found that on the National Intelligence test the I. Q. seemed to rise with the admixture of white blood, but they cautioned against too strict an interpretation of their result because of the difficulty of determining accurately the degree of white blood. These investigators found superiority of the mixed as compared with the full bloods on the National Intelligence (Linguistic), but not superiority on the Pintner-Patersen Performance Tests.

Otto Klineberg[3] in his studies on Indians maintains that, there is no adequate proof of fundamental race differences in mentality, and that those differences which are found are, in all probality, due to culture and social environment.

Thomas Russell Garth[4] has done more testing of North American Indians than any other one person. Using

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[2] E. Jamison and P. Sandiford, "The Mental Capacity of Southern Ontario Indians," Journal of Educational Psychology, 1928. XIX pp. 313-328 and 536-551.

[3] Otto Klineberg, Race Differences, p. III.

[4] Thomas Russell Garth, Racial Psychology p.41.

the linguistic type of tests he came to the conclusion that there are no innate racial differences in mentality.

C. W. Telford[5] in 1930 made a study of the test performance of mixed and full blooded Indians in North Dakota. Using tests of the non-linguistic type his results showed that in some instances the Indian was equal or even superior to the White. His study and conclusions suggested the need for more extensive testing, using tests of various types. This particular study is a step in that direction.

STATEMENT OF THE PROBLEM

This thesis is a study of the comparative intellectual abilities of the mixed and full blooded Indians of the United States Indian School of Wahpeton, North Dakota. By means of testing, using both group and individual tests, the writer gathered and compiled data which made it possible to reach some conclusions in regard to the comparative achievement and mental test performances of the subjects used. It was part of the original plan to obtain measures of social and economic background and status of the subjects, but it was not possible to obtain sufficient data to make any comparisons on these bases.

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[5] C. W. Telford, "Test Performance of Full and Mixed-Blood North Dakota Indians," Journal of Comparative Psychology, Vol. XIV No. 1 August 1932.

In addition to the ordinary achievement and intelligence tests such as the Stanford and Otis, tests of a non-linguistic nature, which do not reflect environment and training, were also used. These were the Goodenough Drawing Test, Petersen Rational Learning Test, and certain of the Pintner-Patersen series of performance tests.

All testing of the American Indian by means of the linguistic type of tests has shown a superiority of the mixed bloods over the full bloods. It has been customary to attribute this inferiority of the full bloods to the superior innate abilities of the Whites. It is safe to make the assumption or propose the hypothesis that, if the observed difference between the mixed and full blooded groups is due to differences in cultural background and not heredity, a decided superiority of the mixed-bloods on the achievement and group intelligence tests should be found. This difference should decrease with the individual learning tests and disappear entirely with the non-linguistic performance tests. The object of this line of investigation is to test this hypothesis.

LIMITATION

This study is confined to the examination of the comparative intellectual abilities and physical and social status of the full and mixed-blooded Indian children attending the United States Indian Boarding School located

at Wahpeton, North Dakota. The number of children tested was two hundred and eighty-six.

In the application of the individual tests the greatest drawback to the accuracy and dependability of the results was the rather small number of children in certain groups that were tested.

Information on the factors determining the social status--social and economic conditions on the reservations--of many of the subjects tested was rather meager and incomplete.

The reliability of the records as to the degree of Indian blood of these children was difficult to ascertain. The figures used here were obtained from the Indian Reservation agency records and the Wahpeton Indian School records and are as reliable as any available records can make them.

DATA AND METHODS OF PROCEDURE

Primary source materials obtained through scientific, experimental investigations are the basis of this study. In addition to this the writer gained much valuable information from personal correspondence and interviews as well as first hand examination of sources pertinent to the problem. To make the results of this work more authoritative the experiments and conclusions of numerous prominent race psychologists have been examined and drawn upon freely.

CHAPTER II

THE SUBJECTS USED

The subjects used for this study were the Indian children attending the United States Indian School at Wahpeton, North Dakota. This is one of several boarding schools maintained by the Federal government for the education of its Indian wards. The children come principally from the reservations of the Turtle Mountains (Belcourt, located in the north central part of North Dakota), Fort Berthold (Elbowoods, located in the west central part of North Dakota), Sisseton(Sisseton, located in the eastern part of South Dakota), Consolidated Chippewa (Cass Lake, located in north-central part of Minnesota), and Red Lake (Red Lake, also located in the northern part of Minnesota).

It has been customary to select the children for school attendance on the basis of educational opportunities at home, such as distance from school.[1] In the last few depression years, however, the practice has been to select them chiefly on the basis of social and economic conditions of the homes on the reservations. The government has been making every effort to care for the child

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[1]Telford, C. W. "Test Performance of Full and Mixed-Blood North Dakota Indians," Journal of Comparative Psychology Vol. XIV No. 1, August, 1932.

who comes from the broken home--that is, the home broken by separation or immoral living of the parents. This same opportunity is also given to the children who come from the homes under severe economic and financial stress. In this respect this school, in the last years, has served as an orphanage as well as an educational institution.[2]

Consequently, the students of the United States Indian School at Wahpeton, North Dakota are probably not, at the present time, truly representative of the average Indian since such a large number come from the lower economic levels. This situation must be recognized and considered in such a study as this.

Due to the severe economic conditions on the reservations, this Indian boarding school has been maintaining an attendance far in excess of the Federal appropriation provided for it. This does not imply that the efficiency of the institution, because of overcrowding, is impaired, but rather, that every available facility is being made to function at its highest efficiency in order to best serve the most needy and the greatest number. Much credit for this is due to Superintendent Carl Stevens and his capable force of teachers and employees in

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[2]Gathered from personal interview with Mr. Carl Stevens, Superintendent of the Wahpeton Indian School, and his teachers.

the Wahpeton school.

The majority of the pupils in attendance belong to the Chippewa and Sioux tribes. A few belong to the Shoshone, Gros Ventre, and Arikara tribes. No tribal comparisons are being made in this study.

In this study 286 children were tested. Subdivisions based on degree of Indian blood within the group were made for comparative purposes. Of the 286 tested, 70 were full bloods, 78 three-quarter bloods, 92 one-half bloods and 46 one-quarter bloods. The distribution of these Indian subjects according to degree of blood and grade is indicated in Table I. This same distribution for boys and girls separately is designated in Tables II and III respectively.

Some data on the general health condition and the social and economic background of these subjects were gathered. As pointed out in the introduction, comparatively little information on this was available in the Wahpeton Indian School records. Measurements of height and weight of all these Indian children were made for comparative purposes.

As an integral part of this Indian Educational Institution at Wahpeton, North Dakota, the federal government maintains a general hospital. Trained nurses are employed. Here, the children who require medical attention are given hospitalization and care. Periodically the government Indian Service itinerant physicians, eye, nose

	1	2	3	4	5	6	7	8	9
4/4	11	7	4	10	8	11	9	7	3
3/4	12	12	13	9	8	12	5	3	4
1/2	8	8	12	11	11	9	12	8	13
1/4	0	3	2	2	3	12	8	11	5

Fig. 1.--THE DISTRIBUTION OF THE BOYS AND GIRLS OF THE WAHPETON INDIAN SCHOOL ACCORDING TO GRADE AND DEGREE OF INDIAN BLOOD.

	1	2	3	4	5	6	7	8	9
4/4	5	9	3	2	4	7	6	6	3
3/4	8	9	5	1	3	8	3	2	0
1/2	5	5	5	4	7	4	6	2	6
1/4	0	2	1	0	0	3	3	6	1

Fig. 2.--THE DISTRIBUTION OF THE BOYS OF THE WAHPETON INDIAN SCHOOL ACCORDING TO GRADE AND DEGREE OF INDIAN BLOOD.

	1	2	3	4	5	6	7	8	9
4/4	2	2	1	8	4	4	3	1	0
3/4	4	3	8	8	5	4	2	1	4
1/2	3	3	7	7	4	5	6	6	7
1/4	0	1	1	2	3	9	5	5	4

Fig. 3.--THE DISTRIBUTION OF THE GIRLS OF THE WAHPETON INDIAN SCHOOL ACCORDING TO GRADE AND DEGREE OF INDIAN BLOOD.

and throat specialists, and dentists make general examination of all the students and give special care and attention, diagnostic and surgical, to those who need it.

The disease most common among these Indian subjects seems to be tuberculosis. The records show a large number of both arrested and active cases. Trachoma is the most prevalent eye disorder. Syphilis and other forms of social diseases are not uncommon.

Examination of data relative to the social and economic status and background of these children reveals that a large percentage of them come from homes which are almost wholly dependent upon government relief and lease money. Many of these homes on the reservations, according to the government Indian Reservation Agencies, are one or two room hovels which are far from being conducive to sanitary and wholesome living. As stated before, the government Indian School authorities are making every effort to provide for the children who come from homes disrupted by drink, poverty, disease and death. The boarding school serves a real purpose in this respect.

In regard to the general economic condition of the various Indian tribes in the United States at the present time it is interesting to note, according to John Collier,[1]

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[1]John Collier, Associated Press News, Grand Forks Herald, Grand Forks, North Dakota, April 21, 1937.

Commissioner of Indian Affairs, that there is a re-birth among Indians of an independent spirit which he says, helps keep Uncle Sam's per capita expense for them doan to around $60 to $90 a year.

As evidence of a growing independence of spirit, Collier cites that some tribes will not accept government assistance except as a last resort.

The Commissioner's annual report says, however, that "the Indian economic level, by and large, is still the lowest in the United States."[2]

As an experiment, more or less apart from this main study of the comparative intellectual abilities of the mixed and full blooded Indians, the writer requested the children of the seventh, eighth, and ninth grades, approximately one hundred in number, to write to her and state what they would like to do--that is, what occupation or profession they would like to enter when they had completed their school training. Without exception, these boys and girls expressed their desire to further prepare themselves in order to be better able to serve their own people and to improve the home conditions on the reservation. Here, then, is a situation which the Indian authorities might well heed and capitalize upon. It has long been maintained that the government educates the Indian only to have him return to his blankets and tepees. There is a reason for

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[2]John Collier, Associated Press News, Grand Forks Herald, Grand Forks, North Dakota, April 21, 1937.

this action on the part of the educated Indian. In the past, it has been the practice to take the Indian youth, inculcate in him the white man's culture and religion, yet not accept him into the Whites' society. Discriminated against, this Indian youth takes the only alternative and returns to the reservation. But, again, he finds himself an outcast for he has abandoned the culture and religion of his own people. Eventually, he is a "blanket" Indian.

The government Indian Educational Service is attempting to put into effect a new plan to bring about a closer understanding between the Indain and his benefactor. First, there is a definite trend to revert back to the old Indian arts and culture. By encouraging the use of the native Indian language and perpetuating the native arts, a better understanding and a more kindly feeling is promoted between the white man and the red man. The morale of the Indian is being raised as he is made to feel that he has something to offer which our social order respects and accepts. In the second place, the method to attain this better cooperation is to bring the Indian and his white helpers--teachers and government officials--into closer and more sympathetic contacts. For this reason, Indian Service Teachers' Institutes are conducted right on the Reservations. The Pine Ridge Indain Reservation of South Dakota has been chosen as one such mutual meeting place for the Indian and his helpers.

CHAPTER III

THE TESTS USED

Differences between the white and Indian languages and cultures are the two factors which have made difficult any valid conclusions in studies of comparative mental abilities of mixed and full blooded Indians. On the reservation the Indian still speaks his native tongue. This can not be over-looked in a testing program which aims to measure the innate abilities of the individual. This language handicap is equally evident and true with the Indian as it has been in the case of the immigrant in this country.

The Indian culture, typical of the ancient Indian civilization, has never been fully understood or appreciated by the white man. Consequently, no mental measuring devices based upon Indian culture have as yet been devised. For this reason the "white man's tests," as the Indian refers to them, are still being used in measuring the mental processes of the red man. It is difficult to conceive of these tests as giving a true and valid measure under the circumstances. The Indian subject is necessarily at a decided disadvantage.

These two factors, that is language and culture,

determined as far as it was feasible the choice of the tests used in this study. Two types of tests were selected for this study. One which would reflect rather markedly the cultural background of the subjects tested, and the other which would less markedly reflect the environment. The standardized group Stanford Achievement Tests and the Otis Intelligence Tests were chosen for the former and for the latter the non-linguistic and performance type of tests such as the Goodenough Drawing Test, the Peterson Rational Learning Test, and three tests from the Pintner-Paterson Series.

Three individual non-linguistic performance tests were administered to all twelve-year-old subjects irrespective of grade. The Peterson Rational Learning Test, which for racial comparisons has been found better than the ordinary intelligence test, was also used on this same group.

The three non-linguistic performance tests consisted of the following:

1. The Pintner-Paterson Profile Test. Figure 4.

This test consists of one large board and seven smaller pieces which when fitted together form the profile of a head. The child is told to put this together as quickly as he can.

2. Sequin-Witmer-Sylvester Form Board. Figure 5.

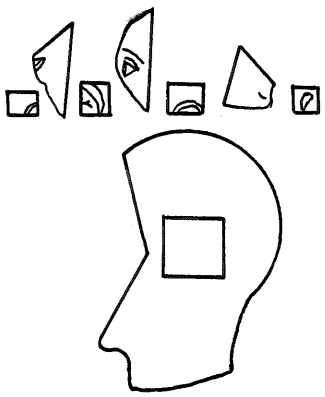

Fig. 4.--KNOX-KEMPF FEATURE PROFILE TEST [a]

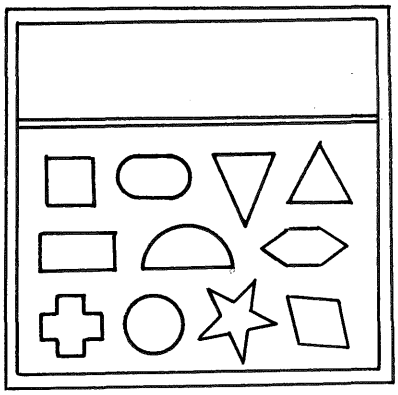

Fig. 5.--SEQUIN-WITMER-SYLVESTER FORM BOARD [b]

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[a] Augusta F. Bronner, William Healy, Gladys M. Lowe and Myra E. Shimberg, A Manual of Individual Mental Tests and Testing, p. 118.

[b] Ibid., p. 130.

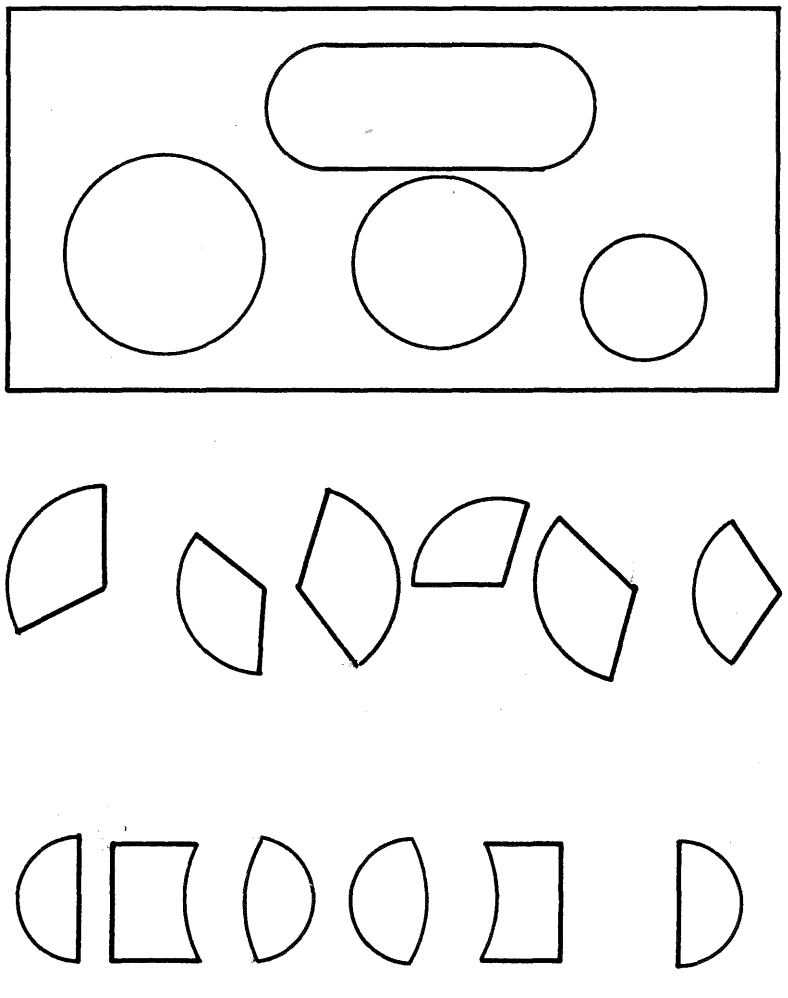

Fig. 6.--KNOX-CASUIST FORM BOARD[a]

[a] Augusta F. Bronner, William Healy, Gladys M. Lowe and Myra E. Shimberg, A Manual of Individual Mental Tests and Testing, p. 111.

In this test the performer is asked to put the eleven blocks in their proper places as rapidly as he can. Three trials with a slight variation each time are allowed. The subject is permitted to use both hands and encouraged to work fast.

3. Knox-Casuist Form Board. Figure 6.

This performance, which is slightly more difficult than the above mentioned one, is the second individual test applied. The object is to let the child familiarize himself with the less complicated performances first. Here again the performer is asked to properly place the blocks in the least possible time.

In the profile test the time alone was recorded. In the other two of these tests the time needed and moves necessary to complete the performance were recorded. In all three of these tests standard procedure was strictly followed.

The Peterson Rational Learning Test was the last individual test administered to this particular group of twelve-year-olds. To each child the following instructions were given:

"The letters A, B, and C are numbered 1, 2, and 3, but A may not be 1, B may not be 2, and C may not be 3. They are numbered just by chance. Now I am going to call out A and you must guess until you find the number that goes with A. I shall tell you when you find the number, and then call out B. When you guess the number for B, I shall call out C. All you have to do is to remember the number that goes with each letter so that you can give

them all without making a mistake. Remember that all the letters have different numbers."

The experimenter then called out A and recorded in order under A on his sheet all the numbers spoken by the subject. When the right number was given the experimenter said "right" and immediately called B, and when B's number was given, C was called. All responses were recorded as given. The process was repeated until the subject got all numbers correct, and without error twice in succession. This constituted the preliminary exercise and was given to make sure that he understood the problem. Then the following additional instructions were given:

"Let us now take letters A, B, C, D, and E in the same way. The numbers will then go from one to five. We shall do just as we did before."

A complete objective record of all the subject's responses was kept by the experimenter. The time required for the learning was kept by means of a stop watch. The score consisted of three factors: (1) the total errors, (2) the number of repetitions including the last two correct ones, and (3) the time required to learn the problem.

Another non-language test used was the Goodenough (draw-a-man) test. This is a group test which has been found to be the least objectionable of all group tests used in racial comparisons work because it does notas markedly reflect the cultural background of the subjects.

This is a test to measure the intelligence through drawing. It was administered to all children from grades one to six inclusive. It is not given to the higher grades for it is not recommended for children above the age of twelve years. Each child is provided with a clean sheet of paper and a sharp pencil and the following instructions given:

"On these papers I want you to make a picture of a man. Take your time and work very carefully. I want to see whether the boys and girls in the Wahpeton school can do as well as those in other schools. Try very hard to see what good pictures you can make."

The precautions and instructions given by Miss Goodenough for administering the test were carefully observed and followed. After the allotted time was up the papers were gathered. The procedure for scoring these tests was also carefully followed.[1]

The Otis Self-Administering Tests of Mental Ability is a group test of linguistic nature. This intelligence scale is designed to test general mental ability. The scale is issued in two series: (1) a primary examination, and (2) an advanced examination. The primary examination is designed especially for the kindergarten and for grades one to four. The advanced examination is designed for grades five to twelve. In fact it may be conveniently

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[1] Florence Goodenough, Measurement of Intelligence by Drawing, pp. 85.

used for all literate persons including university students. The primary form consists chiefly of pictures and figure problems while the intermediate and advanced form consists of abstract reasoning problems.

To administer the examination the tester begins by addressing the pupils as follows:

"We are going to give you some booklets now, and we will tell you pretty soon what you are to do with them. Do not open or turn over the paper. Part of the test is to see if you can follow directions."

And from there on standard procedure for administering and scoring this test was followed.

Another group test used on the Wahpeton Indian subjects was the New Stanford Achievement Test. The primary form administered to the second and third grades consisted of a battery of achievement tests in Reading (paragraph meaning and word meaning), Dictation, and Arithmetic (reasoning and computation). The total working time for the primary form is approximately 60 minutes and was divided into two periods.

The advanced form administered to grades four to nine inclusive, consisted of a battery of achievement tests in Reading, Dictation, Language, Usage, Literature, History and Civics, Geography, Physiology and Hygiene, and Arithmetic reasoning and computation.

The total working time for the advanced examination was approximately 150 minutes. This was divided into four fairly equal sessions.

In addition to these tests, two special group tests were used for the first and second grades. These were the Metropolitan Achievement Test and the Metropolitan Readiness Test. The latter was found especially good for the children in the first grade who were not far enough advanced in their reading to be able to follow instructions where reading ability was required.

From the first, the writer made it a point to gain the confidence, trust, and good will of all her Indian children before testing them. This was not difficult to do. A spirit of harmony and friendliness seemed to prevail everywhere. Each and every child participated and cooperated willingly, and in many cases, eagerly. It was not uncommon to find these children exceedingly cheerful and talkative which, to the writer, belied the traditional idea that the Indian is silent, sullen, and reticent.

CHAPTER IV

RESULTS AND INTERPRETATIONS OF TESTS

All of the testing involved in the present study was done between February 15 and March 1, 1937. All tests were administered by the writer.

The testing facilities were excellent. The individual testing was carried on in the school library to which the children were called individually as they were needed. The group tests were given in the regular class rooms. The group tests were administered to each group separately. For convenience and to insure individual work the first and second grade groups were divided into two sections because of their large size.

Every attempt was made to have the physical surrounding as comfortable and wholesome as possible for the children. In addition to this every effort was made to make the general atmosphere and spirit conducive to efficient work--to make the children put forth their best efforts. Without exception the cooperation of the children was very fine.

Standard procedure for administering these tests was strictly adhered to in all testing. The scoring of all tests, also, was done according to standard procedure.

To assure accuracy all scoring and all statistical computations were carefully checked.

For the group tests the median was chosen as the measure of central tendency. The first and the third quartiles were calculated. From these the quartile deviations or "q's" were found as the measure of variability. Then the differences of the medians, and the probable errors of the differences were calculated. The formula used for finding the probable error was: Probable Error of Difference: $5/4 \sqrt{\frac{Q^2}{N} + \frac{Q^2}{N}}$. The critical ration were found as follows: Critical Ratio: $\frac{\text{Diff. of Medns.}}{\text{P.E. of Diff.}}$

The means and average deviations were used as the measures of central tendency and dispersion respectively for the individual tests.

Results for the individual tests administered to 26 twelve year old boys and girls, irrespective of grade, are shown in Tables I to VIII.

I. THE INDIVIDUAL TESTS

TABLE I. TIME ELEMENT IN THE RATIONAL LEARNING TEST ADMINISTERED TO 26 FULL AND MIXED BLOOD INDIANS, WAHPETON, NORTH DAKOTA

Subjects	Mean	Aver. Dev.	Diff. of Mean	14.56
Full Bloods	102.08	58.88	P. E. Diff.	20.86
Mixed Bloods	116.64	67.16	Crit. Ratio	.69

These figures for the time element in the Rational Learning Test show the full blood Indians slightly superior to the mixed blood Indians. Due to the small number of subjects, however, the differences do not prove to be statistically reliable. The time unit used was seconds.

TABLE II. THE NUMBER OF ERRORS MADE IN THE RATIONAL LEARNING TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	2.02
Full Bloods	32.83	14.35	P. E. Diff.	5.35
Mixed Bloods	34.85	18.30	Crit. Ratio	.73

TABLE III. NUMBER OF REPETITIONS NECESSARY TO COMPLETE THE RATIONAL LEARNING TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	.51
Full Bloods	9.08	2.75	P. E. Diff.	9.55
Mixed Bloods	8.57	2.83	Crit. Ratio	.05

Again in the number of errors and the number of repetitions necessary to complete the exercise of the Rational Learning Test the figures show the full bloods slightly ahead of the mixed bloods.

TABLE IV. TIME ELEMENT IN THE PERFORMANCE OF THE SEQUIN FORM BOARD TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	1.02
Full Bloods	18.16	3.11	P. E. Diff.	9.95
Mixed Bloods	19.85	4.13	Crit. Ratio	.10

TABLE V. THE NUMBER OF WRONG MOVES IN THE PERFORMANCE OF THE SEQUIN FORM BOARD TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	1.30
Full Bloods	2.91	.64	P. E. Diff.	.32
Mixed Bloods	4.21	1.81	Crit. Ratio	4.06

In the Sequin Form Board performance, Tables IV and V respectively, both in the time necessary and the number of wrong moves made, the full bloods were superior to the mixed bloods. The figures for the results for the number of moves made are statistically reliable. If the computation of the critical ratio (Crit. Ratio) reaches 3 or above the figure is considered statistically reliable.

TABLE VI. TIME ELEMENT IN THE PERFORMANCE OF THE CASUIST FORM BOARD TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	17.63
Full Bloods	127.08	65.49	P. E. Diff.	24.85
Mixed Bloods	144.71	84.42	Crit. Ratio	.70

TABLE VII. NUMBER OF WRONG MOVES IN THE PERFORMANCE OF THE CASUIST FORM BOARD TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	2.15
Full Bloods	6.75	3.87	P. E. Diff.	1.58
Mixed Bloods	8.90	5.45	Crit. Ratio	1.36

In the performance of the Casuist Form Board Test the results as given in Tables VI and VII for both time and errors favor the full bloods.

TABLE VIII. TIME ELEMENT IN THE PERFORMANCE OF FEATURE PROFILE TEST

Subjects	Mean	Aver. Dev.	Diff. of Mean	14.56
Full Bloods	102.08	58.88	P. E. Diff.	20.86
Mixed Bloods	116.64	67.16	Crit. Ratio	.69

In the performance of the Feature Profile Test, Table VIII, where the time element alone is considered, the results again favor the full bloods.

Summarizing the results for the four non-linguistic tests administered to 26 twelve-year-old boys and girls irrespective of grade, the figures are, without exception, in favor of the full bloods.

2. THE GOODENOUGH INTELLIGENCE DRAWING TEST

The Goodenough Intelligence Drawing Test was administered to 166 children in grades one to six inclusive. As previously stated this test was used because it does not reflect cultural background and influence as markedly as many of the ordinary standard intelligence tests do. The results for this test are given in tables IX-A, IX-B, and IX-C.

Table IX-A, giving the medians of scores by degree of blood, shows the full bloods to be 5.63 above the 3/4 bloods, 5.55 above the 1/2 bloods but .20 below the 1/4 bloods. These differences with the exception of those for the 1/4 and full bloods are statistically reliable.

TABLE IX-A GOODENOUGH DRAWING TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	17	47	62	40	126
Med.	36.50	30.75	30.67	36.30	31.15
Q	9.19	7.79	7.77	7.25	7.76

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	5.51	1.68	3.06
2. Full-3/4	5.63	1.88	2.99
3. Full-1/2	5.55	2.00	2.77
4. Full-1/4	0.20	3.13	0.06

The medians of mental ages and intelligence quotient, Tables IX-B and IX-C, again show the full bloods considerably superior to the mixed bloods.

TABLE IX-B GOODENOUGH DRAWING TEST

MEDIANS OF MENTAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	17	47	62	40	126
Med.	12:1	11:2	10:8	12:2	10:11[1]
Q	1:11	2:1	1:11	1:11	1:11

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	2.09	0.26	8.03
2. Full-3/4	1.40	0.28	5.00
3. Full-1/2	1.00	0.44	2.27
4. Full-1/4	0.10	0.41	0.02

The medians of the intelligence quotients by degree of blood according to the Goodenough Drawing Test as indicated in Table IX-C are considerably higher than the figures for previous and similar tests on comparable groups have been. There is a probable reason for this. The nature of the scoring of this test is such that it

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[1] The colon here separates the years and months. This illustration represents 10 years and 11 months.

is difficult to prevent the subjective element to enter into the computations. Any possible leniency in scoring does not, however, invalidate the results for comparative purposes.

TABLE IX-C GOODENOUGH DRAWING TEST

MEDIANS OF INTELLIGENCE QUOTIENTS BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	17	47	62	40	126
Med.	91.50	91.50	96.50	99.00	93.55
Q	11.56	14.66	14.22	17.50	14.91

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	5.45	3.84	1.41
2. Full-3/4	2.50	4.13	0.60
3. Full-1/2	7.50	4.38	1.71
4. Full-1/4	7.50	4.93	1.52

The results for the Goodenough Intelligence Test confirm the results of the other non-linguistic tests used in so far as they consistently show the full bloods equal or superior to the mixed bloods.

3. THE OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY

The Otis Self-Administering Test of Mental Ability was administered to 164 subjects. This Intermediate Examination was given to grades four to nine inclusive. The results for the intermediate group are, in general, similar to those of the Primary Examination group. The superiority of the mixed bloods over the full bloods prevails.

Table X-A shows the medians of the mental ages, and discloses the fact of a gradual decrease in mental ages with increase in degree of Indian blood. For the four subdivisions (1/4, 1/2, 3/4, and 4/4) the medians of the mental ages are 12:11, 12:3, 11:6, and 11:3 respectively.

TABLE X-A OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY

MEDIANS OF MENTAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	39	56	30	39	164
Med.	12:11	12:3	11:6	11:3	12:2
Q	1:7	1:8	0:8	1:3	1:6

TABLE X-A (Continued) OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY MEDIANS OF MENTAL AGES BY DEGREE OF BLOOD

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.92	0.28	3.25
2. Full-3/4	0.25	0.29	0.86
3. Full-1/2	1.00	0.37	2.70
4. Full-1/4	1.67	0.38	4.39

Examination of Tables X-B and X-C, giving the medians of scores and intelligence quotient by degree of blood, also reveals that there is a consistent decrease in average score, and intelligence quotient with the increase in degree of Indian blood.

TABLE X-B OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	39	56	30	39	125
Med.	45.25	40.20	33.85	32.70	39.45
Q	9.54	10.13	5.19	8.60	9.39

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	6.75	2.03	3.32
2. Full-3/4	1.15	2.25	0.51
3. Full-1/2	7.50	2.41	3.11
4. Full-1/4	12.55	2.60	4.82

TABLE X-C OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY

MEDIANS OF INTELLIGENCE QUOTIENTS BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	39	56	30	39	125
Med.	93.25	90.25	85.00	81.25	89.31
Q	8.80	8.79	7.19	8.94	8.69

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	8.06	2.04	3.95
2. Full-3/4	3.75	2.44	1.53
3. Full-1/2	9.00	2.31	3.89
4. Full-1/4	12.00	2.51	4.78

The significant fact about these results is that they are in keeping with the findings of Hunter and Sommermier (1922) who gave the Otis Intelligence Test to 715 American Indians at the Haskell Indian Institute at Lawrence, Kansas. These investigators found, that when the subjects were classified into four groups (1/4, 1/2, and 4/4) according to the per cent of Indian blood, a steady decrease in average score was found with the increase in Indian blood. In their study the median I. Q.'s of these respective groups were 109, 91, 78 and 67. Differences between these groups were found to be statistically reliable. In this study the median I. Q.'s of these same

groups are 93, 90, 85, and 81. As Table X-C indicates, these figures, with the exception of the differences between the full and 3/4 bloods, are statistically reliable. It will be noticed that the difference within the group is not so large (12) as it is in Hunter's and Sommermier's findings (42).

THE PRIMARY OTIS GROUP INTELLIGENCE TEST

The primary form of the Otis Group Intelligence Test was administered to 90 subjects in the first, second, and third grades. Tables XI-A, XI-B, and XI-C summarize the comparisons made between the four groups on this test.

The medians for the scores, mental ages, and intelligence quotient, all show the full bloods to be without exception inferior to the three subdivisions of the mixed bloods. The highest varibility comes between the full bloods and 1/4 bloods in the medians of the intelligence quotient where the difference is 15.60. The figures in all three tables consistently show the 1/4 bloods superior to all the other groups.

TABLE XI-A PRIMARY OTIS GROUP INTELLIGENCE TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	7	26	34	23	67
Med.	67.75	63.00	61.60	58.50	62.69
Q	8.25	8.03	7.78	7.50	7.85

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	4.19	2.24	1.87
2. Full-3/4	3.10	2.56	1.21
3. Full-1/2	4.50	2.77	1.62
4. Full-1/4	9.25	4.36	2.12

TABLE XI-B PRIMARY OTIS GROUP INTELLIGENCE TEST

MEDIANS OF MENTAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	7	26	34	23	67
Med.	10:6	10:4	10:1	9:9	10:3
Q	0:9	0:9	0:8	0:7	0:8

Groups Compared	Diff. of Mean	P. E. of Diff.	Crit. Ratio
1. Full-Mixed	0.4	0.08	0.5
2. Full-3/4	0.2	0.08	0.2
3. Full-1/2	0.5	0.06	0.8
4. Full-1/4	0.7	0.46	0.15

The results, as a whole for the primary examination of the Otis Intelligence Test indicate a decided and consistent superiority of the mixed bloods over the full bloods. This is contrary to the findings in the non-linguistic performance tests but in keeping with what others have found when using this same test on similar groups.

TABLE XI-C PRIMARY OTIS GROUP INTELLIGENCE TEST

MEDIANS OF INTELLIGENCE QUOTIENTS BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	7	26	34	23	67
Med.	104.75	92.75	95.00	89.15	94.79
Q	5.63	6.45	7.91	6.19	8.50

Groups Compared	Diff. of Mean	P. E. of Diff.	Crit. Ratio
1. Full-Mixed	5.64	2.20	2.56
2. Full-3/4	5.85	2.36	2.47
3. Full-1/2	3.60	2.25	1.60
4. Full-1/4	15.60	3.10	5.03

4. THE NEW STANFORD ACHIEVEMENT ADVANCED TEST

The New Stanford Achievement Advanced Test was given to 164 students in grades five to nine inclusive. The figures for the results of this test are summarized in Tables XII-A, XII-B, and XII-C.

Here, again, as in the primary group, the full bloods are chronologically older than the mixed bloods as shown in Table XII-A. There is a difference of eight months between the full bloods and the mixed group as a whole. It is interesting to note that, despite this chronological age difference, the mixed bloods are decidedly superior to the full bloods both in average scores and average educational age as indicated in Tables XII-A, XII-B, and XII-C.

TABLE XII-A NEW STANFORD ACHIEVEMENT ADVANCED TEST

MEDIANS OF CHRONOLOGICAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	40	52	33	39	125
Med.	15:8	15:4	15:10	16:2	15:6
Q	1:2	1:4	1:8	1:5	1:0

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.67	0.31	2.15
2. Full-3/4	0.33	0.46	0.72
3. Full-1/2	0.83	0.37	2.25
4. Full-1/4	0.50	0.37	1.35

Table XII-B shows the average score of the full bloods to be 75.88 while the score of the mixed group as a whole is 83.12. Here, in the Stanford Achievement Test, as was also found in the results of the Otis Intelligence Test, there appears to be a consistent and gradual decrease in ability corresponding to the increase in the degree of Indian blood. This same superiority of the mixed bloods is reflected in Table XII-C which shows the medians of the educational ages. The average educational age of the full bloods is 12:2 and that of the mixed bloods is 13:1, making a difference of eleven months in favor of the mixed bloods. Here, also, when the four subdivisions of degree of blood are considered, there is a consistant decrease in educational achievement with the corresponding increase in degree of Indian blood.

TABLE XII-B STANFORD ACHIEVEMENT ADVANCED TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	40	52	33	39	125
Med.	85.14	84.00	78.50	75.88	83.12
Q	5.63	10.86	5.81	9.60	8.68

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	7.24	2.15	3.36
2. Full-3/4	2.62	2.29	1.14
3. Full-1/2	8.12	2.69	3.01
4. Full-1/4	9.26	2.21	4.19

TABLE XII-C NEW STANFORD ACHIEVEMENT ADVANCED TEST

MEDIANS OF EDUCATIONAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	40	52	33	39	125
Med.	13:1	12:11	12:4	12:2	12:9
Q	0:8	1:5	0:7	1:2	1:1

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.51	0.27	0.19
2. Full-3/4	0.17	0.26	0.65
3. Full-1/2	0.75	0.34	2.20
4. Full-1/4	0.91	0.27	3.37

THE NEW STANFORD ACHIEVEMENT PRIMARY TEST

The New Stanford Achievement Primary Test was administered to 60 subjects in the third and fourth grades. Tables XIII-A, XIII-B, and XIII-C give the results for this test.

TABLE XIII-A NEW STANFORD ACHIEVEMENT PRIMARY TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	4	21	23	12	48
Med.	47.00	49.50	49.50	49.50	49.00
Q	3.25	4.93	7.81	5.00	6.23

TABLE XIII-A (Cont'd) NEW STANFORD ACHIEVEMENT PRIMARY TEST MEDIANS OF SCORES BY DEGREE OF BLOOD

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.50	2.10	0.24
2. Full-3/4	0.0	2.73	0.00
3. Full-1/2	0.0	2.23	0.00
4. Full-1/4	2.50	2.71	0.92

The medians of the chronological ages by degree of blood shown in Table XIII-C for the four subdivisions (1/4, 1/2, 3/4, and 4/4) are 11:6, 12:7, 11:11, and 13:2 respectively. The full bloods are one year older than the mixed group as a whole, and one year and eight months older than the 1/4 bloods. This is a significant difference in chronological age and must be taken into consideration when other comparisons are made between the groups. The educational quotients for the subdivisions (1/4, 1/2, 3/4, 4/4, and mixed bloods) are .87, .77, .77, .75, and 82 respectively.

TABLE XIII-B NEW STANFORD ACHIEVEMENT PRIMARY TEST MEDIANS OF EDUCATIONAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	4	21	23	12	48
Med.	9:9	9:11	9:11	10:0	10:1
Q	0:3	0:5	0:7	0:4	0:5

TABLE XIII-B (Cont'd) NEW STANFORD ACHIEVEMENT PRIMARY TEST MEDIANS OF EDUCATIONAL AGES BY DEGREE OF BLOOD

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.08	0.14	0.57
2. Full-3/4	0.08	0.19	0.42
3. Full-1/2	0.08	0.17	0.47
4. Full-1/4	0.25	0.18	0.39

TABLE XIII-C NEW STANFORD ACHIEVEMENT PRIMARY TEST MEDIANS OF CHRONOLOGICAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	4	21	23	12	48
Med.	11:6	12:7	11:11	13:2	12:2
Q	0:6	1:1	1:3	0:9	1:2

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	1.00	0.31	3.22
2. Full-3/4	1.25	0.46	2.71
3. Full-1/2	0.58	0.37	1.68
4. Full-1/4	1.67	0.37	4.51

For example, the median of the educational ages by degree of blood, Table XIII-B, shows the full bloods one month below the mixed group as a whole. But since the full bloods are one year older chronologically than the mixed

bloods it gives a still greater advantage of one year and one month to the mixed bloods. The educational quotients for the subdivisions (1/4, 1/2, 3/4, and 4/4, and the mixed bloods) are .79, .78, .83, .75, and .82 respectively.

In the same measure, the medians of the scores are affected by the difference in the chronological ages. According to Table XIII-A, the average score of the full bloods is slightly above those of the mixed bloods--.50 as a whole, but 2.50 above those of the 1/4 bloods. When corrections are made, however, for the difference in chronological age, this superiority of the full bloods in the medians of the score disappears.

5. THE METROPOLITAN ACHIEVEMENT TEST

The Metropolitan Achievement Test was administered to 61 pupils in the first and second grades.

The medians of the chronological ages of this group given in Table XIV-B shows the mixed bloods to be five months older than the full bloods. The average chronological age for the full bloods is ten years, and ten years and five months for the mixed bloods. The degree of retardation these figures show is significant. This great retardation here in the lower grades seems to suggest that it is due to late entrance into school.

TABLE XIV-A METROPOLITAN ACHIEVEMENT TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	5	11	27	18	43
Med.	29.00	23.00	27.50	27.00	27.00
Q	5.50	8.75	7.38	6.67	7.44

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.0	2.43	2.43
2. Full-3/4	0.50	2.65	0.18
3. Full-1/2	4.00	3.53	1.13
4. Full-1/4	2.00	3.65	0.54

According to Table XIV-B there is no difference between the full bloods and mixed bloods in the average score. The average score is 27.00 for those two groups, but 29.00 for the 1/4 bloods.

TABLE XIV-B METROPOLITAN ACHIEVEMENT TEST

MEDIANS OF CHRONOLOGICAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	5	11	27	18	43
Med.	10:6	10:2	10:5	10:0	10:5
Q	1:7	1:4	1:3	0:10	1:4

TABLE XIV-B (Cont'd). METROPOLITAN ACHIEVEMENT TEST MEDIANS OF CHRONOLOGICAL AGES BY DEGREE OF BLOOD

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	0.42	0.35	1.20
2. Full-3/4	0.42	0.39	1.07
3. Full-1/2	0.17	0.56	0.30
4. Full-1/4	0.50	0.92	0.54

Here, again, however, if corrections are made for the difference in chronological ages the figures would show the mixed bloods inferior.

THE METROPOLITAN READINESS TEST

The Metropolitan Readiness Test was administered to 27 first graders. As pointed out once before this test was found to be very appropriate in this grade for the reason that it did not call for any reading ability. Although these children were tested in February, many of them had not been in school for more than two or three months because of late entrance into school in the fall. Consequently, some of them had little or no reading knowledge and ability. Despite this fact, the performance proved particularily apt, as the test required no reading ability, or knowledge.

TABLE XV-A. METROPOLITAN READINESS TEST

MEDIANS OF CHRONOLOGICAL AGES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	1	8	11	7	20
Med.	12:6	10:8	9:3	9:2	10:2
Q	0:3	1:6	1:0	0:11	1:3

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	1.00	0.56	1.78
2. Full-3/4	0.08	0.57	0.14
3. Full-1/2	1.50	0.48	3.13
4. Full-1/4	3.33	0.53	6.28

The medians of the chronological ages as found in Table XV-A reflects the retardation of these pupils. The average age of the full bloods is nine years and two months while that of the mixed bloods is ten years and two months.

TABLE XV-B. METROPOLITAN READINESS TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	1	8	11	7	20
Med.	72.50	99.50	97.50	82.25	97.25
Q	0.75	10.50	4.75	17.25	6.00

TABLE XV-B (Cont'd). METROPOLITAN READINESS TEST

MEDIANS OF SCORES BY DEGREE OF BLOOD

Groups Compared	Dif. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	15.00	8.27	1.81
2. Full-3/4	15.25	8.35	1.82
3. Full-1/2	17.25	9.38	1.83
4. Full-1/4	9.75	8.20	1.18

The average score according to Table XV-B is 82.25 for the full bloods and 97.25 for the mixed bloods. This gives a decided superiority to the mixed bloods for the average score but when the corrections are made for the difference in chronological ages then the apparent superiority of the mixed bloods disappears.

6. HEIGHT, WEIGHT, AND HEALTH COMPARISONS

Data relative to the general health conditions of the subjects studied were gathered from the school and hospital records. In the Wahpeton Indian School each teacher is required to take the measurements of the height and weight of all the children in her room each month. For this study the February records were used.

Table XVI-A, giving the medians of the weights by degree of blood of 278 children, shows the average weight

of the full bloods to be 96.86 pounds compared to 101.50 pounds for the mixed bloods.

TABLE XVI-A. WEIGHTS BY DEGREE OF BLOOD

	1/4	1/2	3/4	Full	Mixed
Total Cases	52	81	77	68	211
Med.	113.29	104.36	86.92	96.86	101.50
Q	18.50	18.86	20.00	25.84	21.45

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	4.64	4.33	1.07
2. Full-3/4	9.94	4.84	2.05
3. Full-1/2	7.50	4.44	1.69
4. Full-1/4	16.43	5.06	3.25

The medians of the heights, according to the degree of blood, are given in Table XVI-B. Here, the average height of the full bloods is 5 feet 1/2 inch, whereas, the average height for the mixed bloods is 5 feet 25/27 inch, which gives a slightly greater height for the mixed bloods. Considering the three subdivisions (1/4, 1/2, and 3/4), the medium height of the subjects decreases with the increase in Indian blood. For example, the 1/4 bloods have a height of 62.61 in., the 1/2 bloods a height of 61.18 in., and the 3/4 bloods a height of 58.77 in.

TABLE XVI-B. HEIGHTS BY DEGREE OF BLOODS

	1/4	1/2	3/4	Full	Mixed
Total Cases	52	81	77	67	211
Med.	62.61 in.	61.18 in.	58.77 in.	60.50 in.	60.92 in.
Q	36.13 in.	36.39 in.	48.40 in.	48.30 in.	48.74 in.

Groups Compared	Diff. of Mean	P.E. of Diff.	Crit. Ratio
1. Full-Mixed	.04	.89	.044
2. Full-3/4	.143	1.04	.014
3. Full-1/2	.057	1.05	.054
4. Full-1/4	.177	1.19	.149

The health comparisons of mixed bloods and full bloods as shown in Table XVI-C indicates no significant differences between the two groups. Previously, it was stated that tuberculosis was prevalent among the Indian students at the Wahpeton School. These tables do not reflect this for the reason that a large number of the tubercular cases were confined to the hospital at the time the testing was performed. As pointed out before, however, trachoma is the most prevalent eye disorder.

The percentages shown in the percentage column in Table XVI-C, are based on the total cases in each health division considered--vision, trachoma, throat, teeth, hearing, skin, and lungs.

TABLE XVI-C. HEALTH COMPARISONS OF FULL AND MIXED BLOODS

HEALTH CONDITION	FULL BLOODS Total Cases	FULL BLOODS Percentage	MIXED BLOODS Total Cases	MIXED BLOODS Percentage
VISION				
Normal	45	66%	145	69%
Poor	2	3	10	5
Wear glasses	21	32	55	26
TRACHOMA				
Operated on	5	7	14	7
Diseased	4	6	9	4
None	59	87	186	89
THROAT				
Normal	64	93	194	93
Injured	2	3	6	3
Tonsils out	2	3	5	2
Tonsils enlarged	1	1	2	1
Need operation	0	0	2	1
TEETH				
Normal	39	57	157	75
Good	16	24	31	15
Poor	13	19	22	10
HEARING				
Normal	67	99	207	99
Poor	1	1	2	1
SKIN				
Normal	62	91	201	96
Poor	6	9	8	4
LUNGS				
Normal	62	91	193	92
Poor	1	1	10	5
Tuberculosis	6	9	6	3
TOTALS	477	702[a]	1,537	700[a]

[a] Percentages approximately the same.

7. COMPARISONS BETWEEN WHITES AND INDIANS BY CHRONOLOGICAL AGES

Extremely interesting phenomena appear in Figures 7, 8, 9, 10, and 11 showing the norms and differences by chronological ages between the Whites and the all bloods of the Indians on the Stanford Achievement Tests, Otis Intelligence Tests, and the Goodenough Drawing Test. In the Stanford and Otis tests for both the primary and advanced groups there is a distinct tendency toward superiority in the lower age levels over that of the higher age levels of the Indians as compared to that of the norms of the Whites.

This fact points to a decided acceleration in the lower age brackets in contrast to retardation in the upper age brackets. The greatest difference is indicated in Figure 8 for the Otis Primary test which shows the median score for the eight-year-old Indian to be 15.50 above the White norm. In the Intermediate Otis Test, Figure 9, however, the median score for the lowest age level, eleven-year-olds, is slightly below (2.50) the norm of the Whites. But the next age level, twelve-year-olds, is slightly above (2.50) the White norm. The Achievement Tests, Figures 10 and 11 for both primary and advanced groups, show a consistent superiority for the lower age levels.

On the other hand, Figure 7 showing the norms and differences by chronological ages between the Indians and

the Whites on the Goodenough Drawing Test, shows the lowest age level of seven years to be slightly below (2.00) the White norms. But the following three age levels--eight, nine, and ten-year-olds, show a superiority of the Indians over the Whites.

It is difficult to account for this superiority of the Indians in the lower age brackets. It is possible to make some surmises in regard to it. The selective factor cannot here be considered since a large percentage of the students now attending the Wahpeton school come from the poor and broken up homes on the reservations.

The comparative school attendance of the lower and higher grades might throw some light on the situation. In the Wahpeton school the pupils in the first grades who entered school at the beginning of the school term have been regular in attendance during the school year. In the upper grades, on the other hand, are the pupils who previously have perhaps spent several years in some reservation day school where their attendance was irregular and the school term short.

Racial and educational psychologists have suggested possible reasons for this apparent acceleration in the lower grades and retardation in the upper ones. Gordon[1] found that with gypsy children who attend school only 35 per cent of the time, there is a decided tendency for

the I. Q. to drop as the child grows older.

J. V. Breitwieser[2] in his book, "Psychological Education," says, "The negro creates an important educational problem in the United States. Up to a certain stage in his development he seems to get along as well as the white, but during the secondary period he begins to show signs of retardation.

. . . . . .

Recent studies show that the negro grows faster and develops earlier,--which indicates that his secondary training should begin earlier."

The writer would suggest that the 7-year-age level in the Goodenough Drawing Test, which is shown to be below the white norm as indicated in Figure 7, no doubt, represents the so-called kindergarten members of the first grade who were allowed to take this test although they were eliminated from some of the other tests used in the first grade. As pointed out before, these children had not been in school more than a month or two in many cases and were eliminated from the other tests because of their inability to interpret them.

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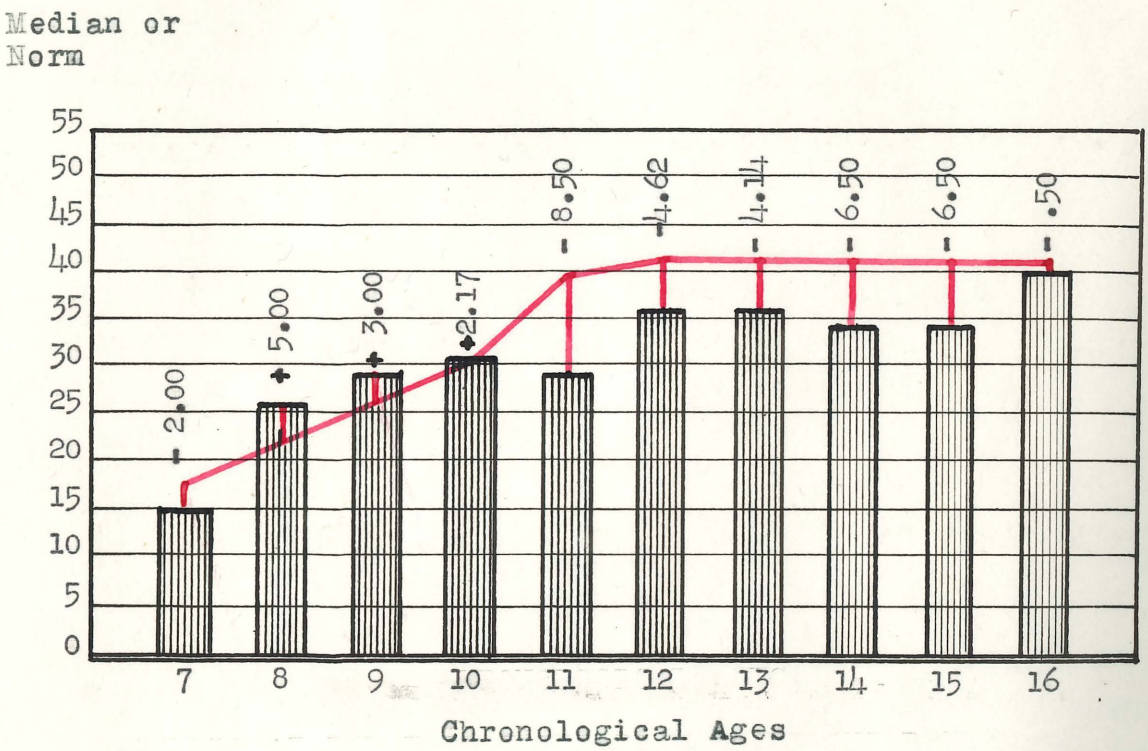
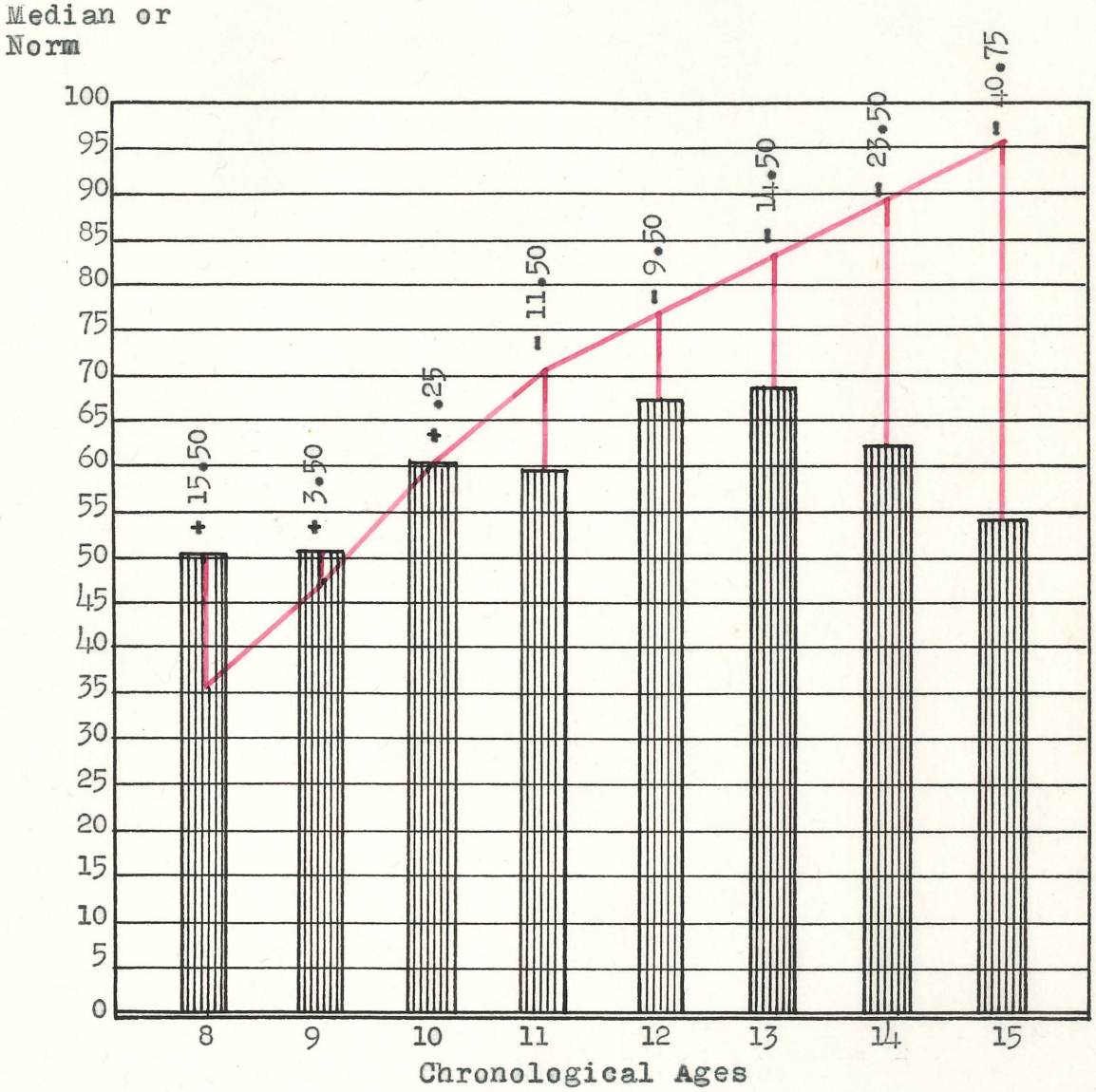
[1] H. Gordon, "Mental and Scholastic Tests Among Retarded Children."
[2] J. V. Breitwieser, Psychological Education, p. 40.



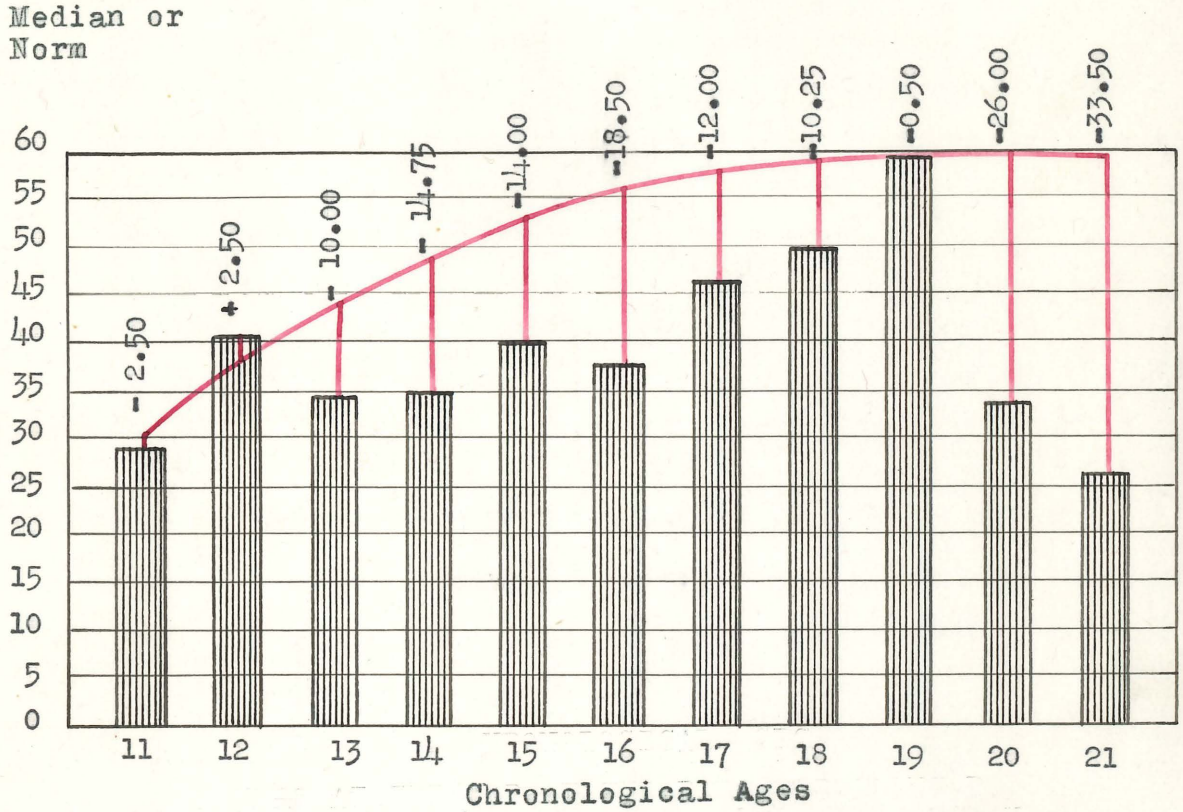
Figures at the top of the bars represent difference between the Median and the Norm--the red line representing the Norm, and the bars representing the Median.

Fig. 7.--NORMS AND DIFFERENCES BY CHRONOLOGICAL AGES FOR THE GOODENOUGH DRAWING TEST.



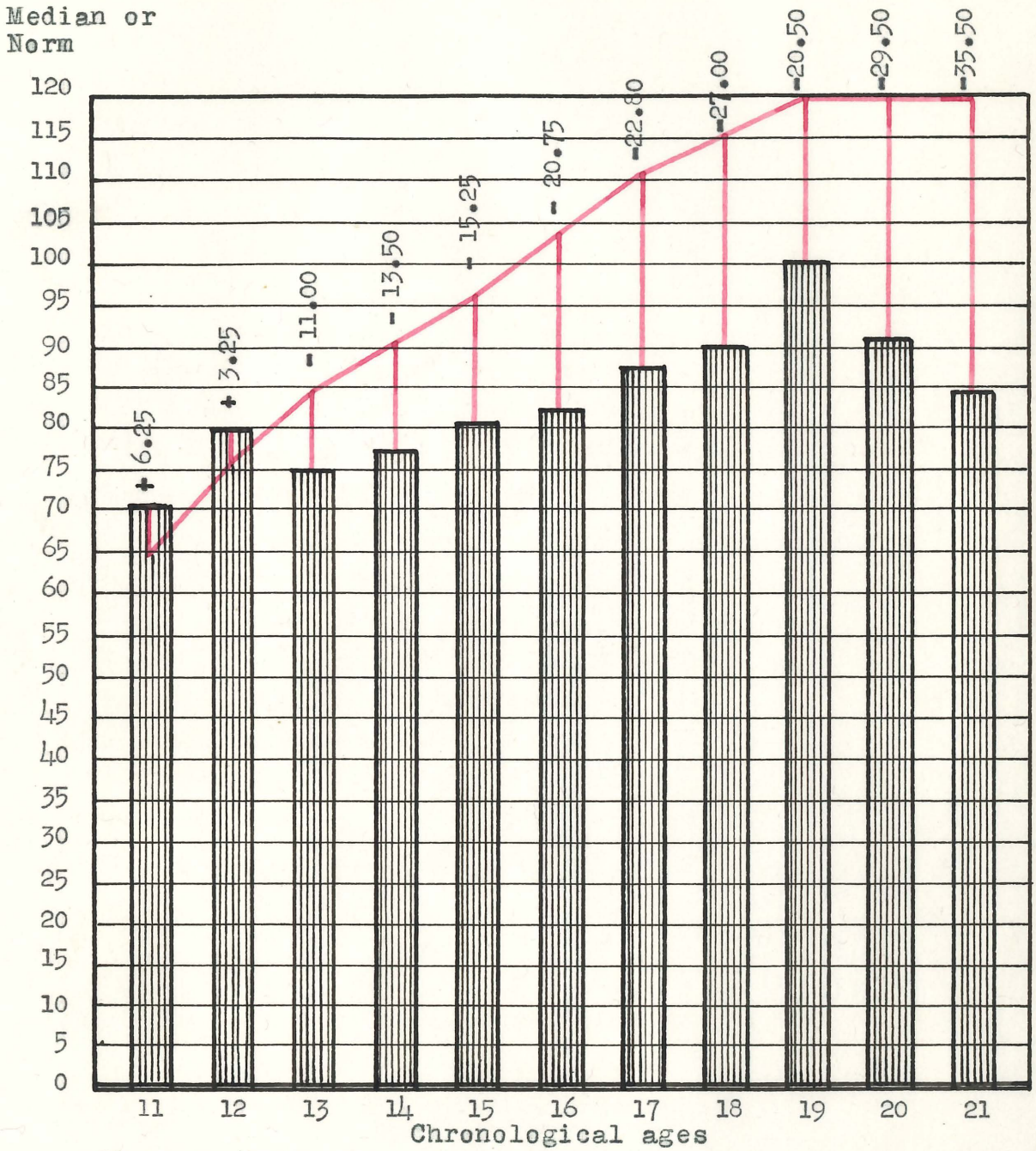
Figures at the top of the bars represent difference between the Median and the Norm--the red line representing the Norm, and the bars representing the Median.

Fig. 8.--NORMS AND DIFFERENCES IN CHRONOLOGICAL AGES FOR THE OTIS PRIMARY TEST.



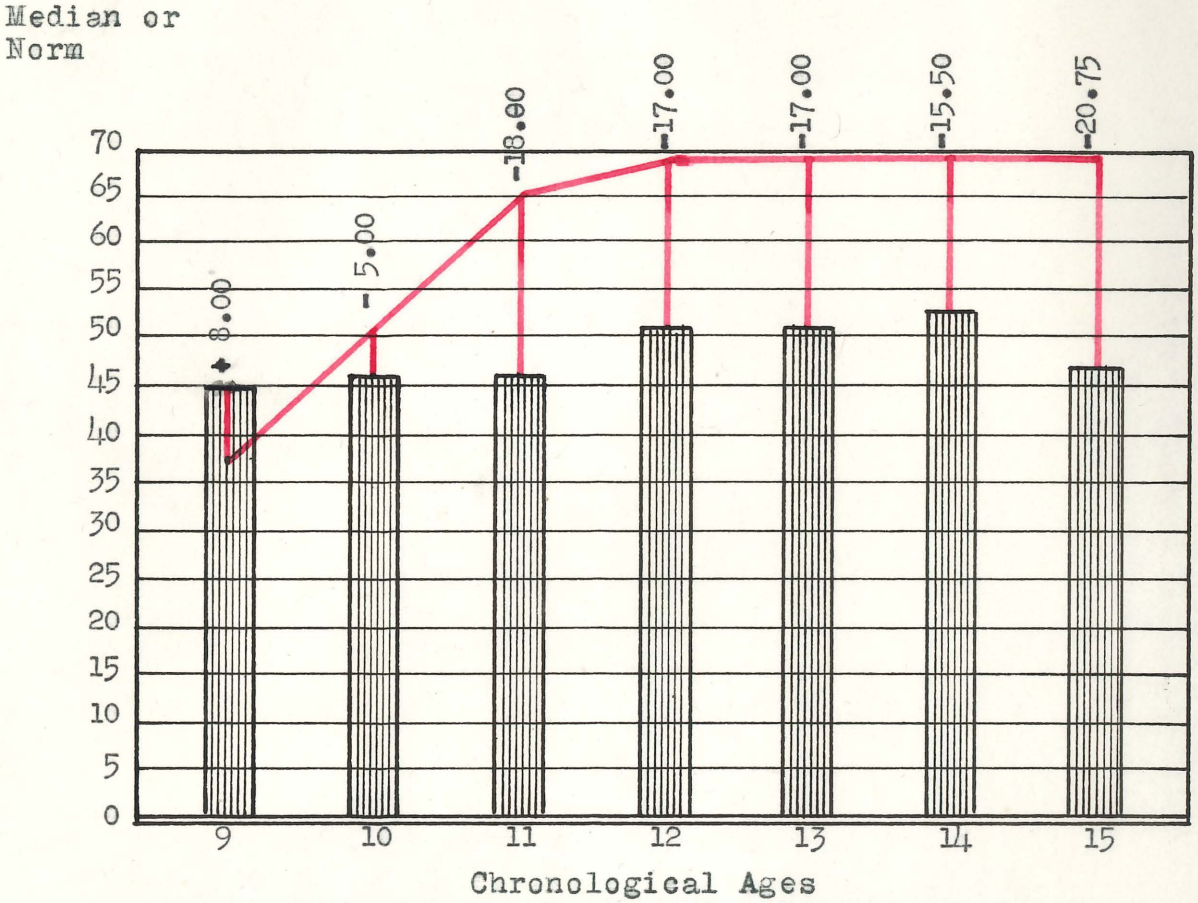
Figures at the top of the bars represent differences between the Median and the Norm--the red line representing the Norm, and the bars representing the Median.

Fig. 9.--NORMS AND DIFFERENCES BY CHRONOLOGICAL AGE FOR OTIS INTERMEDIATE TEST.



Figures at the top of the bars represent difference between the Median and the Norm--the red line representing the Norm, and the bars representing the Median.

Fig. 10.--NORMS AND DIFFERENCES BY CHRONOLOGICAL AGES FOR THE STANFORD ACHIEVEMENT ADVANCED TEST.



Figures at the top of the bars represent difference between the Median and the Norm--the red line representing the Norm, and the bars representing the Median.

Fig. 11.--NORMS AND DIFFERENCES BY CHRONOLOGICAL AGES FOR THE STANFORD ACHIEVEMENT PRIMARY TEST.

CHAPTER V

A SUMMARY OF THE CONCLUSIONS OF THIS STUDY

RELATION BETWEEN DEGREE OF INDIAN BLOOD AND TEST SCORES

The purpose of this study as declared in the Introduction was to find the quantitative relationship between the intellectual abilities and the degree of blood of the Indian children of the United States Indian School, Wahpeton, North Dakota. Two types of tests were used. These were the standard Stanford Achievement and Otis Intelligence Tests, and the non-linguistic performance tests. In the statement of the problem in Chapter I the hypothesis was advanced that if the difference between the mixed and full blood groups was due to differences in cultural background, and not heredity, a decided superiority of the mixed bloods on the achievement and group intelligence tests should be found; that this difference should decrease with the individual learning tests, and disappear entirely with the non-linguistic performance tests.

Computation of the results of the Stanford Achievement and Otis Intelligence tests both showed that when the subjects were classified into the four subdivisions (1/4, 1/2, 3/4, and 4/4) according to the per cent of Indian blood, a decided and steady decrease in average score was found with the increase in Indian blood, a fact which is shown in the tables in Section 3 of Chapter IV in the Otis

Intermediate and Primary Group Tests, and in Section 4 of the same chapter, in the New Stanford Achievement Advanced and Primary Tests tables.

This is in agreement with the findings of Hunter and Sommermier[1], and Jamieson and Sandiford[2] who used the Otis Intelligence and National Intelligence tests respectively.

Thomas Russell Garth[3] and his students, using the National Intelligence Test on 1,050 full bloods of a fairly representative population from different tribes, found a median group I. Q. of 68.8. For a group of 1,000 full bloods, using the Otis Intelligence Test, they found a median group I. Q. of 70.4, making a total of 2,050 subjects with a group I. Q. of 69. These figures are slightly higher than the findings of Hunter and Sommermier (I. Q. for full bloods on Otis Intelligence Test, 67). It must be remembered that these experimenters used the linguistic type of tests which are based on the white man's culture. In this study the intelligence quotient of the full bloods, according to the Otis Self-Administering Test, was found to be 81.25. Furthermore, the results of the Stanford Achievement Test for both the primary and advanced groups show a

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[1]W. S. Hunter and E. Sommermier, "The Relation of Degree of Indian Blood to Scores on the Otis Intelligence Test," Journal of Comparative Psychology, 1922, pp. 11, 257.

[2]E. Jamison and P. Sandiford, "The Mental Capacity of Southern Ontario Indians," Journal Educational Psychology, 1928. XIX pp. 313-328 and 536-551.

[3]Thomas Russell Garth, Race Psychology, pp. 72-73.

decided and consistent superiority of the mixed bloods over the full bloods in school achievement.

In general, the results derived from the Stanford Achievement Test agree with those of the Otis Intelligence Test.

Figures 8, 9, 10 and 11, giving the median norms and differences according to chronological ages for both Indian and White as found in the results of the Stanford Achievement Test and the Otis Intelligence Test, indicates the Indian in the lower age brackets is above the norm of the White, whereas, he is below the White norm in the higher age brackets.

This is not in agreement with Garth's[4] findings. "In an investigation with mixed blood Indians Garth found a correlation coefficient which would indicate that in the lower grades the degree of white blood is a stronger factor in determining I. Q. then it is in the upper grades. In the last grades it is practically of no significance. Because the degree of white blood was just about equally divided in all grades, it is possible to conclude that education tends to reduce to a minimum, or even nothing, the effect of the presence of Indian blood in the educated mixed blood individual."

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[4]Thomas Russell Garth, Race Psychology, pp. 72-73.

The results of the Goodenough Drawing Test, the Peterson Rational Learning Test, and the Pintner-Paterson series of performance tests all point to the superiority or equality of performance of the full bloods as compared to the mixed bloods.

In the Goodenough Drawing Test the median I. Q.'s of the groups were 91.50 for the 1/4 bloods, 91.50 for the 1/2 bloods, 96.50 for the 3/4 bloods, and 99.00 for the 4/4 bloods.

In the Peterson Rational Learning Test, the full bloods were slightly superior to the mixed bloods, both in the time necessary to finish the test and the number of errors made, but the mixed bloods were superior on the number of repetitions necessary to complete the exercise.

In the Pintner-Paterson Performance Tests, the full bloods proved, without exception, to be slightly superior to the mixed bloods.

Summarizing the results for the five non-linguistic tests, the figures in Table XVII, although not statistically reliable, almost without exception, point to the equality or superiority of the pure bloods over the mixed bloods. The only exception to this is found in the number of repetitions necessary to finish the Rational Learning Test. Here, the mixed bloods are slightly superior (.51) to the full bloods. In this summary the only figures statistically reliable are those for the number of moves necessary in

TABLE XVII. A SUMMARY OF THE NON-LINGUISTIC TESTS

Tests	Mdns.of Full Bloods	Mdns.of Mixed Bloods	Diff.of Mean	P.E.of Diff.	Crit. Ratio
Rational Learning Test (Time--Seconds)	384.60	420.00	35.50	50.96	0.61
(Errors)	32.83	34.85	2.02	5.35	0.73
(Repetitions)	9.08	8.57	0.51	9.55	0.05
Sequin Form Board (Time--Seconds)	18.16	19.85	1.02	9.95	0.10
(Moves)	2.91	4.21	1.30	0.22	5.90
Casuist Form Board (Time--Seconds)	127.08	144.71	17.63	24.85	0.70
(Moves)	6.75	8.90	2.15	1.58	1.36
Profile Feature Test (Time--Seconds)	102.08	116.64	14.56	20.86	0.69
Goodenough Drawing Test (I. Q.'s)	99.00	93.55	5.45	3.84	1.41

the performance of the Sequin Form Board. The greatest difference between the two groups is in the time required to perform. For example, the difference in time for the completion of the Rational Learning Test is 35.50 seconds in favor of the full bloods. These results are in direct keeping with the findings of C. W. Telford[5] in his test performance of North Dakota Indians when using the non-linguistic tests.

5. C. W. Telford, "Test Performance of Full and Mixed-Blood North Dakota Indians."

In direct contrast to the results of the non-linguistic tests, the results of the achievement and intelligence tests show a definite superiority of the mixed bloods over the full bloods. The summary of Table XVIII shows several of the figures to be statistically reliable. In the average scores and intelligence quotients the full bloods are decidedly inferior to the mixed bloods. This is also true for the average mental and educational ages. In addition to this, the full bloods are chronologically older, showing a much greater retardation than the mixed bloods. It is interesting to note, however, that in the primary groups this condition is reversed. Here, the mixed bloods are as old or older than the full bloods. For this primary group the average scores for the full bloods are lower than those for the mixed bloods, but in most instances, when corrections are made for the chronological age difference, this apparent superiority of the mixed bloods tends to disappear. Thus, these results seem to confirm the proposed hypothesis.

It is the contention of numerous race psychologists and writers, that this superiority of one race over another is due, not to innate hereditary factors, but to environmental and educational opportunities.

C. W. Telford[6] in his study on test performance of

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[6] C. W. Telford, loc. cit.

TABLE XVIII. A SUMMARY OF THE GROUP TESTS

Tests	Mdns.of Full Bloods.	Mdns.of Mixed Bloods	Diff.of Mean	P.E.of Diff.	Crit. Ratio
Otis Intermediate Test					
Chronological ages	16:2	15:6	.67	.33	2.03
Mental ages	11:3	12:2	.92	.28	3.25
Scores (average)	32.70	39.45	6.75	2.03	3.32
Intelligence Quotient	81.25	89.31	8.06	2.04	3.95
Primary Otis					
Chronological ages	11:8	11:8	.0	.40	.40
Scores (average)	58.50	62.69	4.19	2.24	1.87
Mental ages	9:9	10:3	.4	.08	.5
Intelligence Quotient	89.15	94.79	5.64	2.20	2.56
Stanford Advanced Test					
Chronological ages	16:2	15:6	.67	.31	2.15
Scores (average)	75.88	83.12	7.24	2.15	3.36
Educational age	12:2	12:9	.51	.27	.19
Stanford Primary Test					
Chronological ages	13:2	12:2	1.00	.31	3.22
Scores (average)	49.50	49.00	.50	2.10	.24
Educational age	10:0	10:1	.08	.14	.57
Metropolitan Achievement Test					
Chronological ages	10:0	10:5	.42	.35	1.20
Scores (average)	27.0	27.0	.0	2.43	2.43
Metropolitan Readiness Test					
Chronological ages	9:2	10:2	1.00	0.56	1.78
Scores (average)	82.25	97.25	15.00	8.27	1.81

the North Dakota Indians came to this conclusion: "Our test results suggest that the alleged superiority of mixed over full blood Indians may be due to more intimate contact with white culture which has resulted in greater educational

opportunities and a higher social status. These differences are reflected in better performance on tests of the information type and in greater achievement along all lines of white endeavor. Such differences do not appear when tests are used which draw on more fundamental learning and motor abilities."

Garth[7] expresses himself on this point as follows: "It is our opinion that the improvement in I. Q.'s for mixed blood Indians is due to the social status of the Indian, which improves in a somewhat regular way with the increased white influence. Just the fact that he has more white blood favors the individual in his social contacts. He is more familiar with white customs and ideals, he comes and goes more freely according as he has more white blood. Social workers among Indians have noted the changed social status which runs with increased degree of white blood. The social status operates more powerfully for the less educated mixed-blood than for the more educated."

J. V. Breitwieser[8] who has written on the subject of "Individual Variations" states, "Studies of racial groups have tended to show that there is little, if any

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[7]Thomas Russell Garth, Race Psychology, p. 41.

[8]J. V. Breitwieser., Psychological Education, pp. 40-41.

inferiority which can be definitely attributed to racial attributes. In many instances we find a group showing inferiority due to unfortunate selection or to the very bad environmental influence surrounding them."

The environment which the isolated Indian reservation offers is not conducive to varied experiences, and since "Intelligence is the ability to integrate experience," according to Dr. Breitwieser, an impoverished environment will be reflected in retardation and low intelligence quotients among Indian children coming from the reservations.

A summary of the conclusion from the findings of this study follow:

1. The mixed bloods are consistently superior to the full bloods on the Stanford Achievement and Otis Intelligence Tests. These are linguistic tests, therefore, tend to reflect the cultural background of Indians.

2. The results of the Goodenough Drawing Test similarily show a rather consistent increase in average scores with increase in Indian blood.

3. The Non-linguistic Performance Tests on the other hand reflect equality or superiority of full bloods over the mixed bloods. In these performance tests, since they reflect cultural background less than other tests, the subjects meet on more common ground.

4. In the performance tests the differences between the Indian and Whites are much greater for speed than accuracy.

5. Comparisons with white norms show the upper grade or age levels decidedly retarded whereas the lower age levels show acceleration. This possibly points to the earlier development of the Indian child, according to this study and previous studies of the Negro.

6. The mixed bloods are slightly taller and heavier than the full bloods.

7. There is no significant difference in the economic status of full and mixed blood Indian children now attending the Wahpeton School due to selection of pupils on the basis of need.

8. There are no significant differences in the health comparisons of the two groups.

9. Observed superiority of mixed bloods on the linguistic type of tests point to closer social and cultural contacts with the white man.

10. There is no relationship between the degree of Indian blood and test performance--using the non-linguistic performance type of tests.

11. With cultural conditions controlled, or using tests equally fair to the Indian and White, the results

tend to support the contention of Thomas Russell Garth[10] to the effect that "there are no racial differences," if by 'racial differences' this authority means innate racial differences.

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10 Thomas Russell Garth, Lecture Notes, Teachers' Institute, Pine Ridge Reservation, South Dakota, 1936.

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